REMARKS

Claims 1 and 2-37 are pending herein, with Claims 1, 11, 27, and 28 being independent claims. Claim 2 is cancelled herein. All claims stand rejected. Responsive to each paragraph of the Office Action, the Applicant has the following remarks:

35 U.S.C. § 112:

Claims 1-10 were rejected under 35 U.S.C. § 112, first paragraph, concerning the use of the term "non-reactive manifold." This term has been removed.

35 U.S.C. § 102:

GRIMBLE

Claims 1-5, 9, and 28-31 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,729,931 to Grimble. The Examiner argued that all manifolds are "non-reactive" such that the limitations of Claim 1 were met. With respect to Claim 28, the Examiner stated that Grimble shows a first heat exchange between the exhaust gas and the oxidant gas in the portion of the air feed tube 6 within the exhaust gas plenum. The Examiner further stated that a second heat is exchanged between the fuel fluid and the oxidant fluid through the cell 5.

The Applicant has amended Claim 1 to recite that the fluid fuel and the oxidant fluid are partially within the fuel cell stack and that heat is exchanged between the partially reacted fuel fluid and the partially reacted oxidant fluid in the manifold without reacting. Further, the combustion chamber has been added with the recuperator surrounding the stack and the combustion chamber and with the stack, the manifold, the

combustion chamber, and the recuperator within the thermal enclosure. Similar amendments were made to Claim 28.

As noted in Paragraph 49, the overall efficiency of a system according to the disclosure herein, in the context of the useful power produced divided by the heating value of the fuel, is estimated to be about fifty-one percent (51%). Further, the concepts described herein are directed towards a very small SOFC system using logistics fuels to meet defense objectives for about a twenty (20) watt DC power system. Compactness and thermal integration were two objectives sought herein so as to provide for improved mission life.

As such, the Applicant asserts that the combination and the positioning of the elements described above provide clear distinctions and benefits over the systems of the prior art. The applicant thus asserts that the claims are patentable over the cited references.

SCHULER

Claims 11-16, 20, and 21 were rejected under 35 U.S.C.§ 102(e) as being anticipated by U.S. Patent No. 6,303,243 to Schuler. In response to the previous Office Action, the Applicant noted that no fluid is delivered from what is described as the "second interior cavity 6" of Schuler. Rather, element 6 is the afterburner chamber. Instead, the fluid is delivered via a supply line 81' from outside the chamber, i.e., outside the manifold. In response, the Examiner stated:

> As shown in Schuler in Schuler Figure 2, supply line (81') is a component of second interior cavity (6). Since supply line (81') is a part of the second interior cavity, fluid is delivered from the second interior cavity.

The Applicant continues to traverse the rejection. First, although Fig. 2 shows the supply line 81 as apparently passing through the afterburner chamber 6, given that this is a cross-sectional view it is more than likely that the two elements are completely separate and would be construed as so by one of ordinary skill in the art. Regardless, Schuler simply does not read on the specific language of the claim even if the supply line 81' does travel through the afterburner chamber 6. Claim 11 states:

> a first flow orifice and a second flow orifice wherein a first fluid is delivered through said first flow orifice from said first interior cavity, *a second fluid is delivered through said second flow orifice from said second interior cavity*, heat is exchanged between said first and second fluids, and *said first and second fluids are kept separate* ....

In this case, no second fluid is delivered from the second interior cavity, i.e., the afterburner chamber 6. Rather, the supply line 81' provides air from outside the cell, not the exhaust from the afterburner chamber 6. Specifically, no air is supplied from the afterburner chamber 6 to the cell 20 for exchanging heat while keeping the fluids separate. The claim limitations are not meet merely by having the supply line 81' within the afterburner chamber 6 (if that is even the case). The claim requires the fluid to come from the second chamber and this simply is not disclosed. The Applicant thus asserts that Claim 11, and the dependent claims thereon, are patentable over the cited reference.

The Applicant further traverses the rejection of dependent Claim 12 concerning a feed tube disposed within the second interior cavity that provides fluid communication between the first interior cavity and the first flow orifice. As is shown in Fig. 2, the supply line 81' leads directly to the interconnect 22 as opposed to the first interior cavity 25.

The Applicant further traverses the rejection of dependent Claim 21 concerning the first interior cavity receiving the fuel and a second interior cavity receiving an oxidant. As is shown in Fig. 2, the second interior cavity 6 is the afterburner chamber. There is no fluid flow from this "second chamber".

35 U.S.C. §103:

GRUMBLE IN VIEW OF BARTON

Claims 6, 10, 27 and 32-35 were rejected under 35 U.S.C. §103(a) as being unpatentable over Grimble in view of U.S. Patent Publication No. 2003/0022050 to Barton, et al.

The Applicant respectfully traverses the rejection of dependent Claim 6 concerning a fuel storage tank in communication with a fuel vaporizer, a pressure relief valve, and an airflow delivery device for the reasons described above with respect to Claim 1. The Applicant further traverses the rejection on the grounds that the storage tank is not in fluid communication with a fuel vaporizer. The Applicant respectfully traverses the rejection of dependent Claim 10 for the reasons described above.

The Applicant further traverses the rejection of independent Claim 27. Claim 27 concerns a fuel cell stack with a manifold, a catalytic partial oxygen fuel reformer, a fuel vaporizer, a combustion chamber, a recuperator, a thermal enclosure, a fuel cell tank, a pressure relief value, and an airflow delivery device. The Applicant traverses the rejection for numerous reasons including those described above with respect to Claim 1. Specifically, the cited references do not show a fuel cell stack having a manifold wherein heat is exchanged between a fuel fluid and an oxidant fluid. Rather, Grimble simply

shows the usual fuel cell reaction. Nonetheless, the Applicant has made similar amendments to Claim 27 as are described above.

The Applicant respectfully traverses the rejection of dependent Claims 33-35 for the reasons given above with respect to Claim 28.

GRIMBLE IN VIEW OF MORROW

Claims 7, 8, 36, and 37 were rejected under 35 U.S.C. §103(a) as being unpatentable over Grimble in view of U.S. Patent No. 4,087,076 to Morrow, Jr., et al. Morrow was described as showing multi-layer radiation shields in a vacuum. The Applicant respectfully traverses the rejection for the reasons given above with respect to Claim 1 and Claim 28. The Applicant further traverses the rejection of dependent Claim 7 concerning the use of a vacuum vessel. It is not clear how the open apertures 8, 10, 12 of Grimble could accommodate the use of a vacuum chamber as is shown in Morrow. The Applicant thus submits that there is no suggestion to combine the references or that such a combination be operable. The Applicant respectfully traverses the rejection of Claim 36 for the same reasons.

SCHULER IN VIEW OF PIASCIK

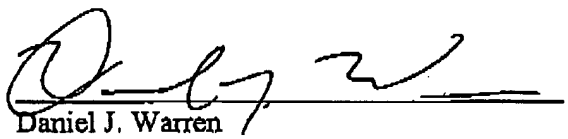
Claims 17-19 and 22-27 were rejected under 35 U.S.C. §103(a) as being unpatentable over Schuler in view of U.S. Patent No. 6,291,089 to Piascik, et al. The Applicant respectfully traverses the rejection of dependent Claim 17 for the reasons described above with respect to Claim 11. The Applicant respectfully traverses the rejection of Claims 18 and 19 for the reasons described above with respect to Claim 11 and in the above paragraph. The Applicant respectfully traverses the rejection of dependent Claims 22-27 for the reasons described above with respect to Claim 11 and for

the lack of an off-set fin structure. The Applicant further traverses the rejection of independent Claim 27 for the reasons described above.

CONCLUSION

The Applicant believes it has responded to each matter raised in the Office Action. Allowance of all claims is respectfully solicited. Any questions maybe directed to the undersigned at 404.853.8028.

Respectfully submitted,



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